

*REMARKS*

SUMMARY

Claims 1-21 and 23-91 remain pending in the Application. Claims 1-16, 27-68 and 75-91 stand withdrawn as a result of a Restriction Requirement. The indication of allowability of claims 20, 25 and 74, at page 7 of the Office Action, is noted with appreciation. Claims 20, 25, and 74 have been amended herein, to include all limitations of the base claim and intervening claims from which they depend, and are thus believed to be in condition for allowance. Claims 17 and 69 are amended herein to add limitations similar to those of claim 22 as originally filed. Claim 22 is canceled, without prejudice, and claim 23 is amended to be dependent from claim 17 rather than claim 22.

CLAIM REJECTIONS UNDER 35 USC § 102(b)

**The rejection of claims 17, 18, 21 and 69 as being anticipated by Birkhead (US 6,536,522), as stated on pages 2-4 of the Office Action, is traversed.**

Claim 17, claims 18 and 21 depending from claim 17, and claim 69, all require, *inter alia*, determining values of torque and speed inputs to a progressing cavity pump coupled to an electric motor, by measuring electrical voltages applied to the motor and currents drawn by the motor, and using the measured values of electrical voltages applied to the motor and currents drawn by the motor to calculate the values of torque and speed inputs to the progressing cavity pump.

Birkhead does not disclose these limitations, and cannot therefore anticipate independent claims 17 or 69, or any of claims 18, 19, 21-24 or 26 depending from claim 17, or any of claims 70-73 depending from claim 69.

Birkhead discloses the use of a torque and speed sensor 80 coupled to a rod 15 driving a pump 60, for measuring torque and speed on the rod 15 directly and transmitting signals over a motor input signal line 20 to a controller 25. Birkhead makes no disclosure of any determination of torque and speed from signals sent over a command line 23 from the controller 25 to the motor 10. Birkhead also discloses only methods of controlling speed of the motor 10 with the aid of a downhole casing pressure sensor 50a and a downhole tubing pressure sensor 50b, in conjunction with an upper casing pressure sensor 37. The present invention operates without the need for downhole casing and tubing pressure sensors of the type required in Birkhead.

Claims 18-19 include additional limitations of the method of claim 17 which are also not disclosed by Birkhead. Neither claim 18 or 19 are, therefore, anticipated by Birkhead.

#### CLAIM REJECTIONS UNDER 35 USC § 103

**The rejection of claims 19 and 70-72 as being obvious over Birkhead, are traversed.**

Claim 19 depending from claim 17, and claims 70-72, depending from claim 69, all require, *inter alia*, the limitations discussed above with regard to traversing the rejection under 35 USC § 102(b). As discussed above, Birkhead does not teach or suggest these limitations, and therefore cannot render obvious either claim 17 or 69, or any claim depending therefrom. *See MPEP 2143, basic requirements of a prima facie case of obviousness require that the prior art reference must teach or suggest all the claim limitations. MPEP 2143.03, citing In re Fine, 837 F.2d 1071 (Fed. Cir. 1988) (if an independent claim is non-obviousness under 35 USC 103, then any claim depending therefrom is non-obvious).*

**The rejection of claims 22-24 and 26 as being obvious over Birkhead in view of Mantey (US 5,820,350), is traversed.**

Claim 22 has been canceled herein, thus rendering moot the rejection of claim 22.

Claims 23-24 and 26 all depend ultimately from claim 17. As stated above, and confirmed by the Examiner on page 5 of the Office Action, Birkhead uses a sensor 80 for sensing torque and speed, and fails to teach or suggest that the torque and speed inputs to the progressing cavity pump be determined through measurements of the electrical voltages applied to an electric motor and currents drawn by the motor driving the progressing cavity pump.

At page 6 of the Office Action, the Examiner states:

However, Mantey teaches, in column 4, lines 6-23, that by combining input voltage, amperage and phase angle signals of a powering motor driving the pump, one can ascertain the torque of the motor according to equation 2 at the top of column 4 ( $\text{Torque} = \text{Horsepower} * K / \text{RPM}$ , where K is a constant). Therefore, it would have been obvious to one of ordinary skill in the art to apply the formula and teachings above and substitute for the nominal torque and speed sensor of Birkhead in order to achieve the predictable result of determining the torque of the motor driving a rotary pump.

The Applicants first respectfully submit that the Examiner has made several errors in the factual inquiries required under *Graham v. John Deere Company* in support of the obviousness rejection of claims 22-24 and 26.

Claims 23-24 and 26 all require, *inter alia*, that the speed of the progressing cavity pump be determined by measuring electrical voltages applied to an electric motor driving the progressing cavity pump and currents drawn by the motor. Neither Birckhead nor Mantey teach or suggest determining motor speed in this manner. As discussed above, and admitted by the Examiner at page 5 of the Office Action, Birckhead teaches only the use of a sensor 80 for directly measuring speed of the rod 15 connecting the motor to the pump. In similar fashion, Mantey only teaches direct measurement of the rotational speed of the polished rod being driven by a motor shaft.

In general, the Applicants agree with the Examiner that it might have been obvious to combine the direct speed sensor of Birckhead with Mantey, in the manner suggested by the Examiner. The combination of Mantey and Birckhead does not, however, teach or suggest all limitations of any of claims 23-24 or 26. In fact, the teachings of Birckhead and Mantey standing alone, or in combination, and the Examiner's rationale in suggesting the combination, all serve as evidence directly teaching away from the requirements of claims 23-24 and 26. In direct contrast to doing what might have been obvious, i.e. using a speed sensor for directly measuring speed of the motor or the progressing cavity pump, the present invention eliminates the need for such a sensor or direct measurement through novel utilization of the voltage and amperage at the motor, for determining the torque and speed of the progressing cavity pump. In the present invention, therefore, the functions performed by separate sensors in Birckhead and Mantey are retained despite the elimination of the need for the sensors. *See MPEP § 2144.04 II.B "omission of an element with retention of the element's function is an indicia of unobviousness."*

**The rejection of claim 73, as being obvious over Birckhead in view of Kawabata (US 6,244,831), is traversed.**

Claim 73 depends from claim 69. As discussed above, with regard to traversal of the rejections under 35 USC § 102 and 35 USC § 103, Birckhead does not, contrary to the Examiner's assertion at page 6 of the Office Action, disclose all of the limitations of claim 73 except means using the progressing cavity pump performance values to produce command signals through use of a feed forward signal. The Examiner correctly makes no assertion that Kawabata teaches or suggests the limitations of claim 69, or claim 73

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depending from claim 69, for which the Examiner relies upon Birkhead. Therefore, the combination of Birkhead and Kawabata cannot render claim 73 obvious.

### CONCLUSION

The application is considered in good and proper form for allowance, and the Examiner is respectfully requested to pass this application to issue. If in the opinion of the Examiner, a telephone conference would expedite the prosecution of the subject application, the Examiner is invited to call the undersigned attorney.

### PROCEDURAL MATTERS AND FEES

The Commissioner is hereby authorized to charge the fee for an automatic one month extension of the time for response, and the fees for amending three claims from dependent to independent form, to deposit account number 50-3505. Applicants believe that no other fees or overpayments are occasioned by the submittal of this paper. If any other fees or overpayments are occasioned by the filing of this paper, however, the Commissioner is authorized to charge those fees, or credit any overpayments to deposit account 50-3505.

Respectfully submitted,

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